

6,780,601

We claim:

1. A method of identifying an agent that modulates the activity of a lepidopteran glutamate-gated chloride channel, said channel having the amino acid sequence of SEQ ID NO:14, and said channel being expressed in a host cell, a membrane preparation or an amphibian oocyte, said method comprising:
  - (a) applying glutamate to the host cell, membrane preparation or amphibian oocyte expressing said lepidopteran glutamate-gated chloride channel in the presence of chloride ions and measuring chloride flux; and
  - (b) applying said agent and glutamate to a lepidopteran glutamate-gated chloride channel in the presence of chloride ions and measuring chloride flux;
  - (c) wherein a change in chloride flux in the presence of said agent is an indication that said agent modulates the activity of said lepidopteran glutamate-gated chloride channel.

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We claim:

1. An isolated nucleic acid encoding a lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14.
2. The isolated nucleic acid of claim 1 wherein the nucleic acid is DNA or RNA.
3. The isolated nucleic acid of claim 1 wherein the nucleic acid comprises the nucleotide sequence of SEQ ID NO: 13.
4. The isolated nucleic acid of claim 1 wherein the nucleic acid comprises nucleotides 144 through 1484 of SEQ ID NO: 13.
5. An isolated nucleic acid having at least 90% sequence identity to nucleotides 144 to 1484 of SEQ ID NO: 13 wherein said nucleic acid encodes a lepidopteran glutamate-gated chloride channel.
6. The isolated nucleic acid of claim 5 wherein said nucleic acid has at least 95% sequence identity to nucleotides 144 to 1884 of SEQ ID NO: 13.
7. A vector comprising an isolated nucleic acid encoding a lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14.
8. The vector of claim 7 further comprising a promoter operably linked to the isolated

nucleic acid.

9. A host cell comprising the vector of claim 7.

10. A host cell comprising the vector of claim 8.

11. A host cell expressing a recombinant lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14.

12. A membrane preparation comprising a recombinant lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14.

13. A method of making a recombinant lepidopteran glutamate-gated chloride channel comprising introducing a nucleic acid encoding a lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14 into a host cell and culturing the host cell under conditions suitable for expressing the nucleic acid.

14. The method of claim 13 wherein the host cell is an insect cell.

15. An amphibian oocyte comprising an isolated nucleic acid encoding a lepidopteran glutamate-gated chloride channel having the amino sequence of SEQ ID NO: 14.

16. An amphibian oocyte expressing a lepidopteran glutamate-gated chloride channel having the amino acid sequence of SEQ ID NO: 14.

17. The oocyte of claim 16 which is a *Xenopus* oocyte.